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None

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(54) Tamper evident and child resistant package

(57) A tamper evident and child resistant package comprises a container with a neck finish 8 and a snap-on closure. The neck finish 8 has three annular interrupted beads 5, 6, and 7. Beads 5, 6 have three notches in each; bead 7 is of a larger diameter with two notches therein. These beads also form longitudinal guideways 15 which are co-operable with lugs 34, 35 of the closure. Beneath said beads 5, 6 and 7, a continuous bead 10 co-operates with an interrupted bead 38 of the closure. A tamper band 33 is attached to the closure.

When the closure is snap-fitted to the container, the first series of lugs 34 locate under the second bead and a further two lugs 35 locate under the third bead. With the tamper band 33 removed, and indicias positioned opposite each other, the closure can move upwards through the notches until the first series of lugs 34 contacts the first interrupted bead 5. By rotating the closure clockwise to locate against the top exit notches, the closure can be removed.

FIG. 2

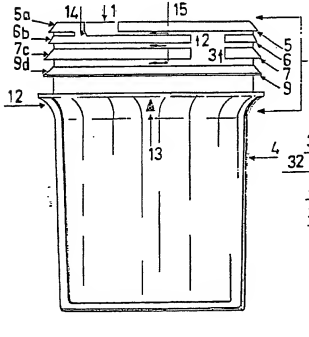
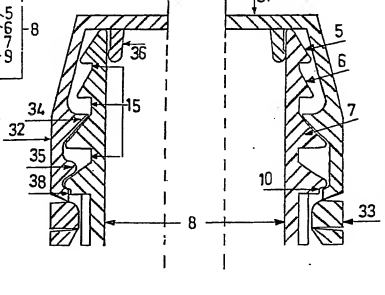


FIG. 9/2



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TAMPER EVIDENT AND CHILD RESISTANT PACKAGE

This invention relates to a tamper evident and child resistant package, that is to say a closure which cannot be removed from its associated container, and subsequently replaced without causing some permanent and readily apparent change to the closure.

One well-known form applied mainly to snap-on caps, involves a tamper or pilfer band attached to the skirt of the cap and requiring to be removed by the user before the cap can be lifted off.

It has been recognised that child resistant packages are necessary in the handling of pharmaceuticals and the like, to deter children from opening the package.

The need accordingly exists for a closure that makes it difficult to remove, even after the tamper-resistance has been broken, without taking some kind of action that is not readily apparent to a child, and which preferably can be installed without special machinery.

Therefore, this package will contain a tamper evident and child resistant closure and container, and will provide moisture vapour transmission resistance in one form.

The present invention is directed to a package utilizing an orientable snap-on closure and container which will provide a low cost package.

Manufacture is effected preferably by injection moulding in a known manner, and with straight ejection from the moulding tool.

Tamper evident and child resistant package comprises a container and snap-on closure, therefore, wherein the container body is closed at the bottom and is open at the top to provide a mouth with an annular rim around the mouth, that the body has a neck finish which includes a series of annular interrupted beads, said beads are axially and diametrically spaced down the neck of the container to form longitudinal guideways, spaced axially beneath the third lower bead a continuous inwardly directed bead said inwardly directed bead is constructed to form an inter-engaging means for engaging the complementary interrupted bead of the closure, beneath a flange extends radially outwards, and wherein said closure has a top wall and a peripheral skirt and positioned on the inner surface of the top wall an annular sealing plug to enter the mouth of the container to make contact with the inside surface of the neck, further comprising a tear away tamper band, joining said tamper band to said skirt edge a weakened membrane, further comprising a series of inwardly extending locking lugs on the inner surface of the peripheral skirt to form an inter engaging means, the arrangement and construction being to locate in the longitudinal guideways formed by the series of interrupted beads within the neck finish and further constructed with an inwardly directed interrupted bead position at the inner edge of said skirt.

The invention will be further described by way of example with reference to the accompanying drawings in which:-

FIGURE 1: is an elevation view of a child resistant and tamper evident package in accordance with the invention.

FIGURE 2: is a front elevation view of the container with the closure removed.

FIGURE 2A: is a fragmentary front elevation view of the upper portion of the container with the closure removed.

FIGURE 3: is a bottom plan view of the container.

FIGURE 4: is a top plan view of the container.

FIGURE 5: is a fragmentary section view taken along the line AA in Fig. 2A.

FIGURE 6: is a fragmentary section view taken along the line BB in Fig. 2A.

FIGURE 7: is a fragmentary view taken along the line CC in Fig. 2A.

FIGURE 8: is a fragmentary section view taken along the line DD in Fig. 2A.

FIGURE 9: is a front elevation of the closure according to the invention.

FIGURE 9.1: is a top view of the closure.

FIGURE 9.2: is a fragmentary vertical view of the closure in position on the container with the tamper band removed.

FIGURE 10: is a fragmentary front elevation view of the closure.

FIGURE 11: is a bottom plan view of the closure with the tamper band removed.

FIGURE 12: is a fragmentary front view of the lower portion of the closure showing the pull tab and tamper band. 12/1 is a fragmentary vertical view of the pull tab and tamper band taken along line AA. 12/2 is a plain bottom plan view of the pull tab and tamper band taken along line BB.

FIGURE 13: is a fragmentary vertical view of the closure applied to the container with four fragmentary vertical section views 13/1, 13/2, 13/3 and 13/4 showing the multi-stage removal of the closure.

FIGURE 14: is a fragmentary vertical view of the closure applied to the container with three fragmentary vertical section views 14/1, 14/2 and 14/3 showing the multi-stage removal of the closure.

FIGURE 15: is a fragmentary section view of the closure taken along the line 3-3 in Fig. 11 showing the closure assembled on the container.

FIGURE 16: is a fragmentary section view of the closure taken along the line 2-2 and 4-4 in Fig. 11 showing the closure assembled on the container.

FIGURE 17: is a fragmentary section view of the closure taken along the line 1-1 in Fig. 11 showing the closure assembled on the container.

FIGURE DESCRIPTIONS

Figure 1:

A child resistant tamper evident package according to the invention, comprises a closure 30 and a container 20.

The closure 30 is preferably made of organic plastic material such as High Density Polyethylene, and the container 20 is preferably made of organic material such as Polypropylene.

Figure 2:

In accordance with the invention, the container (20) has a neck finish (8) which in the illustrated embodiment is formed with three interrupted beads 5, 6 and 7 said beads are axially and diametrically spaced down the neck of the container to form longitudinal guideway (15) between each of the said interrupted beads (5, 6, 7).

The first upper annular interrupted bead (5) having three notches (1) in its periphery, also incorporated in these notches are three inclined exits (14).

The second middle annular interrupted bead (6) said bead being of the same diameter as bead (5), also in its periphery diameter, there are a series of three notches (2) positioned out of sequence to the notches in bead (5).

Also the third lower annular interrupted bead (7) being of a larger diameter than the diameters of beads (5, 6) and in its periphery a series of two notches (3) and these are positioned out of sequence to the notches (1, 2) in bead 5, 6.

The positioning of these notches 1, 2, 3 in the interrupted beads 5, 6, 7 can be seen clearer in Fig. 2A, 4, 5, 6, 7) which show the respective positions of said notches.

The container is further formed with an annular sealing band 9 being continuous, each of the bead 5, 6, 7 and the sealing band 9 have inclined upper surfaces 5^A, 6^B, 7^C and 9^D to facilitate in corporation with the closure a snap action assembly. Formed at the lower edge of the sealing band (9) is an inwardly directed bead (10). (See Drg 13 to 17). Also spaced axially below the annular sealing band, a captive flange (12) extends radially outwards.

Figures 2, 9, 9/2, 10, 11, 12, 14:

In accordance with the invention a child resistant tamper evident closure, (30) includes a flat top wall (31) and a peripheral skirt (32). Joined to the skirt edge (32) by a tear open skin forming a weakened line, viewed in the peripheral direction, it may be closed or interrupted to form a tear open tamper evident band (33).

Positioned on the inner surface of the skirt (32), are two series of inwardly extending locking lugs (34, 35).

The first series of three radially inwardly extending locking lugs (34), are positioned on the inner surface of the skirt (32) and below the flat top wall (31) of the closure, said locking lugs (34) having arcuate extent equal to or less than the arcuate extent of the notches (1 and 2) (Fig 2) and positioned such, that the locking lugs (34) extend beneath the second middle interrupted bead (6) (Fig 2) when the closure is in position on the container, as shown in (Fig 9/2) but does not contact the interrupted bead (6) (Fig 2).

The second series of two radially inwardly extending locking lugs (35) are positioned on the inner surface of the skirt (32), (directly below the first series of locking lugs (34)), having arcuate extent equal to or less than the arcuate extent of the notches (3) (Fig 2) in the interrupted bead (7) (Fig 2), generally diametrically opposite each other and arranged so as to extend beneath the third lower interrupted bead (7) (Fig 2), when the closure is in position on the container, as shown in (Fig 9/2) but does not contact the interrupted bead (7) (Fig 2).

The interrupted beads (6, 7) in conjunction with the longitudinal guideways (15), permit the closure to rotate clockwise or anti-clockwise, also to restrict the closure from an upward movement except when the said closure is brought into the removal position.

The closure would be held in a locking position by the locking lugs (34) (35), positioned on the inner face of the skirt (32). By using the longitudinal guideways (15) between beads (6, 7) and between bead (7) and sealing band (9), the arrangement and construction being such, that said locking lugs locate within the longitudinal guideways.

Figure 9/2:

The interrupted bead (38) positioned at the lower extremities of the skirts inner face (32), the interrupted bead (38) engages the complementary inwardly directed bead (10) of the container. The beads (38 and 10) are used together when assembled to provide radial closure retention over the tolerances between the closure (30) and the container neck finish (8) as shown in Fig. 9/2.

Figures 10, 12, 12/1 and 12/2:

The tamper band (33) is adapted to be completely separated from the closure (30). A tear open membrane (40) line which can be continuous or a plurality of perforations extending in the peripheral direction around the closure (30). The tamper band (33) projects inwardly to engage below the inwardly directed bead (10) of the container (20 Fig. 2) when assembled intact.

When it is desired to remove the tamper band (33), by lifting the tear tab (37) and applying enough shearing force to make the membranes (40) rupture or burst and start to tear, leaving a continuous ring separated from both closure (30) and tamper band (33) resting on the captive flange (12 Fig. 2). Thus, when the authorised user comes to inspect the closure (30) he can readily see whether it is in tact or tampered with by the obvious, the band being whale or separated from the closure.

When the band has been removed from the closure, the said closure can be removed and replace by snapping the closure back on to the container.

Figures 9/2 and 10:

The closure is sealed against entry of the atmosphere or leakage of the contents, by a depending annular plug (36), which seats within the mouth of the container. Said plug (36) having an outward force against the inner wall of the neck (8) (Fig. 2) of the container. Also an annular sealing band (9) (Fig. 2) spaced axially beneath the third lower annular interrupted bead (7) the said sealing band has a snug circumferential contact with the inner surface of closures skirt (32) to provide a moisture vapour transmission resistance.

Figures 2, 9, 12, 15, 16, 19, 20, 21:

When it is desired to remove the closure the first stage is the removal of the tamper band (33) (as described). Thus, the closure is free to rotate in either direction, with an evenly upward force applied to the closure, permitting the disengagement of the lower interrupted bead (38) from the inwardly directed bead (10) Fig. 2.

The locking lugs (34) (35) of the closure are positioned and arranged to locate between the interrupted beads (5) (6) (7) Fig. 2 which have formed a series of longitudinal guideways to facilitate said locking lugs (34) (35) of the closure.

With the interrupted bead (38) disengaged, thus permitting the locking lugs (34) (35) of the closure to move upwards freely and register under the respective interrupted beads (6) (7) (i.e locking lugs (35) registering under bead (7) and the locking lugs (34) registering under bead (6)).

As a result of the construction, there is a substantial radial clearance between the locking lugs (35) and the interrupted bead (38) in relationship to the interrupted beads (5, 6) on the neck finish (8), thus allowing the interrupted bead (38) and locking lugs (35) and inner surface of the skirt (32), to pass over the interrupted beads (5, 6) without any restriction.

The closure cannot move upwards as locking lugs (34, 35) are located with the interrupted beads (6, 7) respectively. The notches in the interrupted beads (1, 2 and 3) are positioned so that the closure cannot be elevated until the external indicia (13) is registered with indicia (39) Fig. 1.

The indicia may be in the shape of an arrow or other suitable indicator on both container and closure.

The use of the upper, middle and lower interrupted beads 5, 6 and 7 on the neck finish with locking lugs 34 and 35 on the closure at different axial and elevation positions, combine to stabilize and cause the closure to rotate evenly, and lugs 34 maintain contact with the neck (8) of the container as it is moved through its multi-stage removal.

The construction and arrangement of the first series of locking lugs (34) are to maintain contact with the neck 8 of the container as it moves through the notches (2) and continue the upward movement to locate under the first interrupted bead (5). The second series of two locking lugs 35 are arranged to disengage the container, simultaneously with the moving upwards of lugs 34, thus locking lugs 35 enter and pass through notches 3.

The inclined exits (14) in conjunction with the notches (1) are arranged and constructed to assist in the removal of the closure from the container.

The design of said inclined exits (14) are an upward drive to the locking lugs (34) of the closure, thus when contact is made between said lugs and the inclined exits, the locking lugs start to ride upwards with the assistance of the inclined exits.

The closure being in its third axial position with both indicia 13 and 39 registered. The locking lugs (34, 35) are ready to move through the notches (2, 3) by an even upward force until the locking lugs (34) reach the interrupted bead (5) of the container. The interrupted bead (38) and locking lugs (35) will now be clear of the respective interrupted beads and being in a position without any restrictions, so that the closure can pass over the interrupted beads (5, 6).

When the locking lugs (34) have reached the upper interrupted bead (5), a further feature of the closure is that it requires to be rotated clockwise to meet notches (1) which have an inclined exit (14). Thus the locking lugs (34) move round under the upper interrupted bead (5) until contact is made with the inclined exit (14) of the notches (1). At this point, locking lugs (34) disengage the container and the closure can be removed completely.

Figures 15, 16, 17:

Showing the closure sitting on the neck of the container with the tamper band removed in conjunction with Fig. 12.

Figures 13, 14:

Showing the closure sitting on the neck of the container with the tamper band removed:-

13/1 14/1 - first stage: removal

13/2 - second stage: locking lugs moved up under the interrupted beads 6, 7

13/3 14/2 - third stage: locking lugs have passed through notches (2, 3) and lugs (34) rest under the interrupted bead (5)

13/4 14/3 - fourth stage: the locking lugs 34 move round under the upper interrupted bead (5) until contact is made with the inclined exit (14) of the notches (1). At this point the locking lugs disengage the said interrupted bead, and the closure is free of the container

The closure can be applied to the neck finish in any orientated position relative to the neck finish, merely by snapping the closure on to the neck, by having the diameters of the upper interrupted beads (5, 6) smaller than the diameter of the lower series of locking lugs (35), therefore, the closure will sit over the neck finish as shown in Fig. 15 15/4 and from that position snapped closed.

When the closure is on the container, the protective flange (12) extends radially outwards below the lower edge of the tamper band (33) and in close proximity thereto to prevent access to the lower edge of the tamper band so that the tamper band cannot be prized away from the container.

CLAIMS

1. Tamper evident and child resistant package comprises a container and snap-on closure, therefore, wherein the container body is closed at the bottom and is open at the top to provide a mouth with an annular rim around the mouth, that the body has a neck finish which includes a series of annular interrupted beads, said beads are axially and diametrically spaced down the neck of the container spaced axially beneath the third lower bead a continuous inwardly directed bead said inwardly directed bead is constructed to form an inter-engaging means for engaging the complementary interrupted bead of the closure, beneath, a flange extends radially outwards, and wherein said closure has a top wall and a peripheral skirt and positioned on the inner surface of the top wall an annular sealing plug to enter the mouth of the container to make contact with the inside surface of the neck, further comprising, a tear away tamper band, joining said tamper band to said skirt edge a weakened membrane, further comprising, a series of inwardly extending locking lugs on the inner surface of the peripheral skirt, to form an inter engaging means with said interrupted beads, and further constructed with, an inwardly directed interrupted bead position at the inner edge of said skirt.

2. A tamper evident and child resistant package as claimed in Claim 1 wherein an interference means is provided on the container at each of the notches in the top interrupted bead co-operable with the closure, to control the sliding off movement of said closure.

3. A tamper evident and child resistant package as claimed in Claims 1 and 2, wherein a longitudinal guideway means are provided on the container co-operable with the closure to control the upward and rotating movement of the closure.

4. A tamper evident and child resistant package as claimed in Claims 1, 2 and 3, wherein an exit guide means are provided in conjunction with the notches in the top interrupted bead of the container co-operable with the closure to assist in removal.

5. A tamper evident and child resistant package as claimed in Claim 1 wherein an annular sealing band is provided on the neck of said container, which has a snug circumferential contact with the inner surface of the closures skirt.

6. A tamper evident and child resistant package as claimed in Claims 1 to 5, wherein the third lower annular interrupted bead being of a larger diameter than the first and second annular interrupted beads, said beads are co-operable with the closure to combine in its multi-stage removal.

7. A tamper evident and child resistant package as claimed in Claim 1, wherein said protective flange extends radially outwardly beneath and in close proximity to the lower edge of the said tamper band.

8. A tamper evident and child resistant package containing a container, constructed and arranged as claimed in Claims 1 to 6 and adapted to operate substantially as hereinbefore, particularly described with reference to and as illustrated in Figures 1 to 17 of the accompanying drawings.

9. A tamper evident and child resistant package containing a closure arranged and adapted to operate substantially as hereinbefore, and as claimed in Claim 1 particularly described with reference to, and illustrated in Figures 1 to 17 of the accompanying drawings.

10. A tamper evident and child resistant package as claimed in Claims 1 and 8 wherein said closure is made of organic plastic materials, and said closure panels, skirt, tamper band and locking lugs are so constructed and arranged as to flex and permit the closure to be snapped onto the neck finish.

11. A tamper evident and child resistant package constructed, arranged and adapted to operate substantially as hereinbefore, particularly described with reference to, and as illustrated in Figures 1 to 17 of the accompanying drawings.

FIG.1

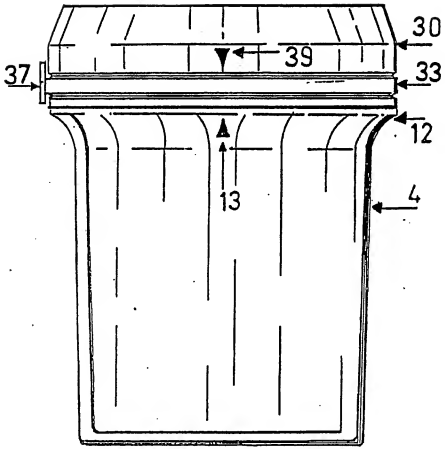

FIG.2

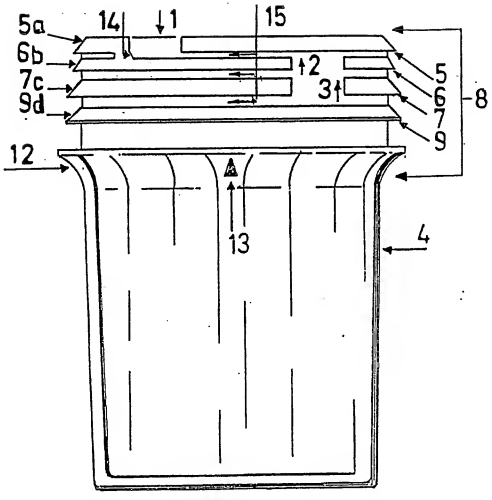

FIG.2A

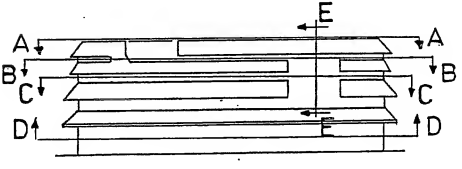

FIG. 3

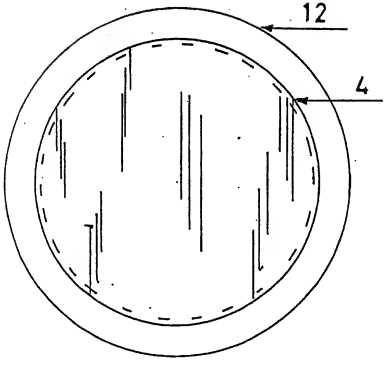

FIG. 4

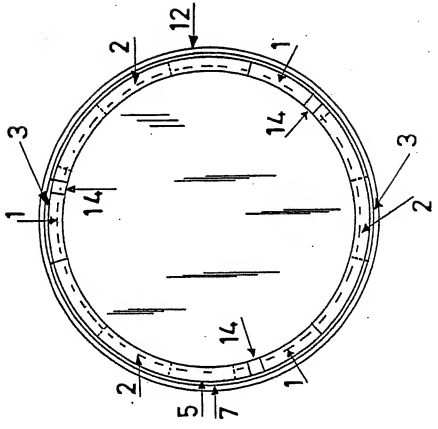

FIG. 5

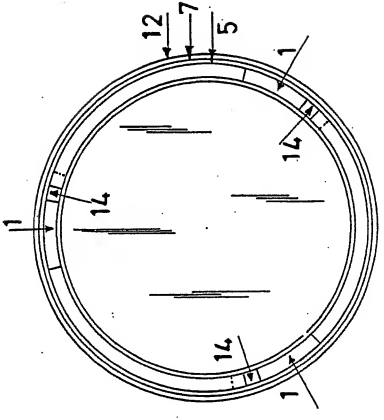

FIG. 6

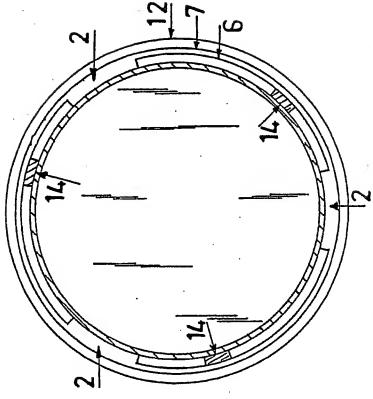

FIG. 7

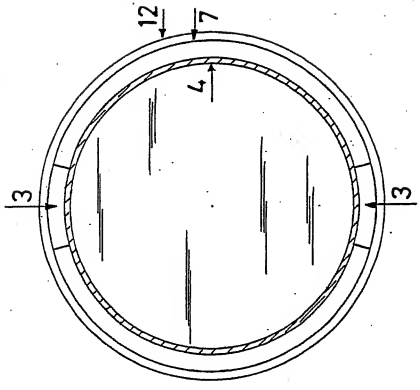

FIG. 8

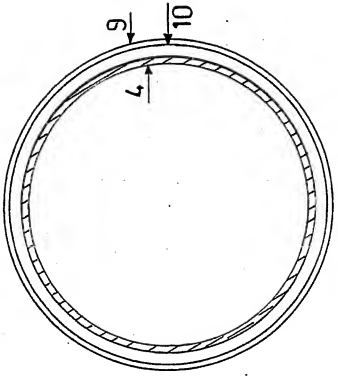

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FIG.9

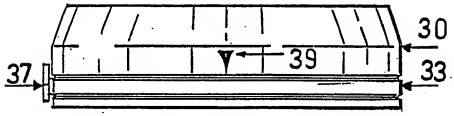


FIG 9/1

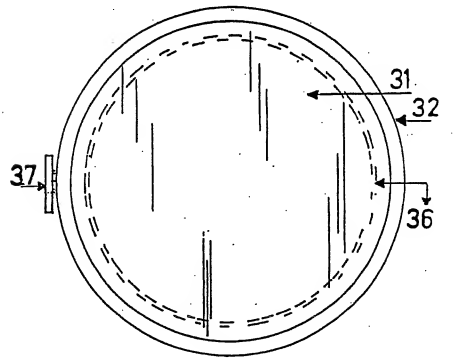


FIG. 9/2

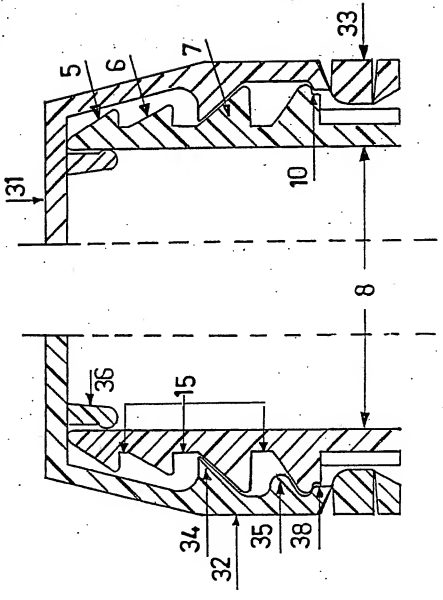


FIG 10

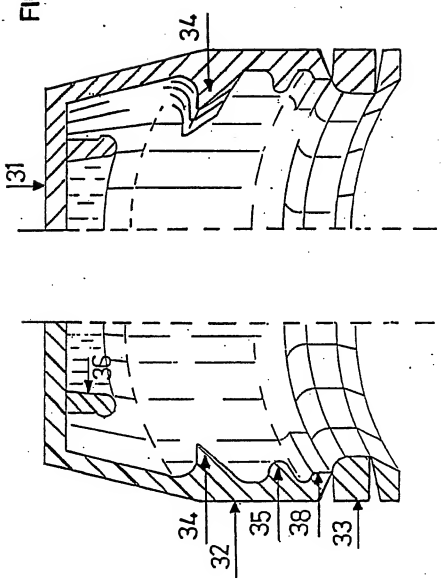


FIG. 11

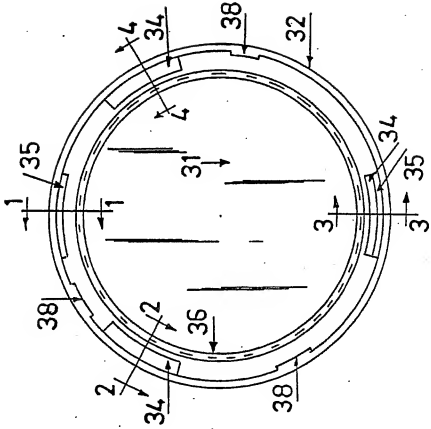
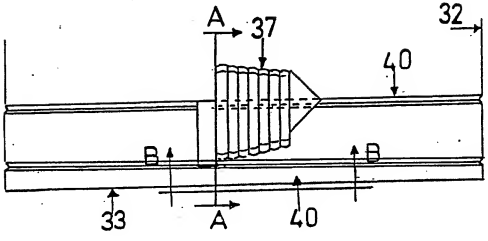


FIG .12



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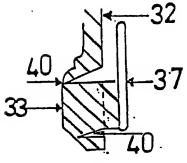

FIG/2

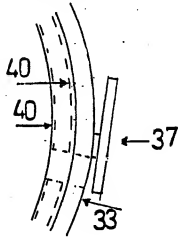

FIG 13

FIG. 14

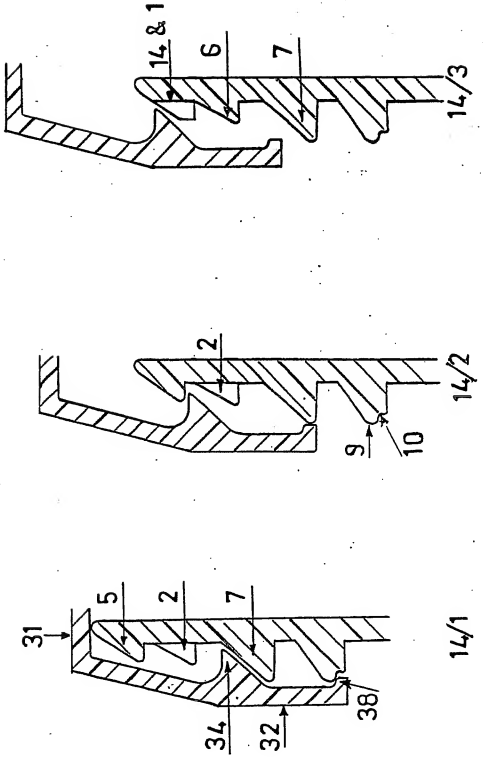

FIG. 15

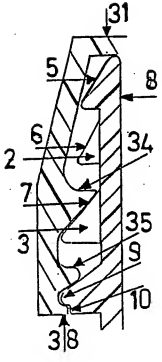

FIG. 16

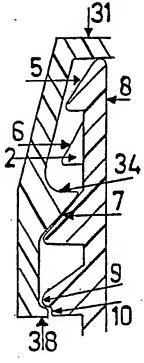

FIG. 17